STANDARDIZED INTERIM PROGRESS REPORT

A. Project Identifiers:

1) Award Number: NA17FX1430

2) Grant Program / CFDA: 11.439

3) Name of Recipient Organization: Texas A&M Research Foundation

4) Principal Investigator: Markus Horning

5) Project Title:
Installation of a Remote Census and Photogrammetry Network: Validation and Assessment of Seasonal & Individual Steller Sea Lion Body Condition and Population Trends.

6) Funding: Federal: $966,139 Match: $ 17,900

7) Award Period: June 1st, 2001 through May 31st, 2004

8) Period Covered by this Report: December 1st, 2001 through June 30th, 2002

B. Project Summary:

The Gulf of Alaska, Aleutian Islands and Bering Sea regions comprise delicate ecosystems threatened by profound regime shifts, and represent one of the biologically and economically most important ecosystems in the United States, providing over fifty percent of fish and shellfish catches in a multi-billion dollar industry. Steller sea lions as one of the apex predator species in this region have declined to about fifteen percent of peak population levels and are currently listed as endangered in the western portion of their range, along the Aleutian Islands and in the Bering Sea. Other species have exhibited less dramatic but nonetheless severe declines. Extensive removal of fish biomass through commercial trawling has been hypothesized as one possible factor involved in the decline of Aleutian and Bering Sea pinnipeds. However, no conclusive data exists to shed light on the hypothesized link between commercial fisheries, nutritional stress and reduced reproductive output of pinnipeds, or to allow for analysis of proximate mechanisms linking hypothesized cause and effect.

Significant fisheries management decisions are being made under dearth of adequate data. This lack of vital data encompasses some of the most basic life-history information: 1) Year-round population census figures of sufficient spatial and temporal resolution, including details on the age structures of populations. 2) Body mass and body condition estimates, both in form of longitudinal data from individual animals as well as cross-sectional data for meta populations. 3) Year-round detailed foraging behavior data of sufficient temporal and spatial resolution to accurately assess fisheries interactions.

Several reasons can be listed for this lack of conclusive data: The species of interest reside in very remote and inaccessible locations in predominantly extreme environments. They include some of the most difficult marine mammal and seabird species to work with, partly on account of their extreme shyness and sensitivity to disturbances. Rookeries and haulouts are difficult to approach, let alone land on, frequently impossible on a repeated basis. Most observations have been limited to the reproductive season during local summer.

Under NMFS - SSLRI funding, we are developing and validating the photogrammetric, remote estimation of body mass and condition of Steller sea lions, using animals held at the Alaska Sea Life Center. Our approach uses three-dimensional photogrammetry based on multiple time-synchronous digital still images from disparate perspectives to obtain accurate spatial measurements, in a novel process recently validated by our laboratory.

We will build and install two remote, Satellite Linked Data Acquisition and Photogrammetry systems (SLIDAP systems), at locations along the Aleutian Islands. The SLiDAP system is currently under development in our lab under NSF funding. The system will consist of remotely accessible (via satellite data link) self-contained digital still imaging stations linked via wireless LAN to into a remote, close range photogrammetric imaging network. We will use the two new SLIDAP systems, in conjunction with two more systems to be built under NSF funding, to collect detailed, year-round census data. We will estimate by three-dimensional photogrammetry, body mass and condition trends at monitoring locations, both cross-sectional and longitudinal, and throughout the year.

This will ultimately allow us to compare seasonal, annual and supra-annual body mass and condition trends to the occurrence of fishing episodes and to levels of biomass removal, and will allow us to assess sensitive periods in the life history of Steller sea lions.

C. Summary of Progress and Results:

Non-scheduled activities:

As previously reported, a permit to conduct the proposed research under the MMPA / ESA has been applied for under the leadership of the Alaska Sea Life Center (ASLC). This permit is continuing to be under review. The work being presently conducted (see below) is permitted under the existing sampling / health assessment permit of the ASLC.

Tasks scheduled for the reporting period:

Tasks scheduled for this reporting period were Task 1, 2 and 3.
Task 1: the preparation of the physiological studies to be conducted at the Alaska Sea Life Center (ASLC) has been concluded.
Task 2: single point validations on captive animals. This task is contingent upon the availability of juvenile Steller sea lions captured in the wild to be brought into the ASLC for temporary captivity. 12 of these "transient" Stellers will be used for the single point validations, in addition to the three resident Steller sea lions currently held at the ASLC. The task is scheduled to be conducted during the course of the next 12 months. The "transient" Steller program at the ASLC is currently delayed for two reasons: the required permit has not been granted yet by the Office of Protected Resources, NMFS, and the construction of the holding facility at the ASLC has not been initiated. This construction will likely not be started until the permit is granted. We are still hopeful that the permit will be granted, and that we can initiate this task within the next 6-12 months. In the meantime, we are preparing for single point validations studies to be conducted on the three resident Stellers at the ASLC.
Task 3: dual point validations on captive animals. The same considerations apply to task three as to task 2. Task three is scheduled to occur during the course of the next 12 monmths, and is held back by the transient Steller program and the relevant permit. We are still hopeful that this task can progress soon, and in the meantime we are preparing to initiate dual point validations on the three resident Stellers at the ASLC.

Related activities:

Even though the following tasks are not part of this NMFS - SSLRI grant, they are relevant to the success of this grant and we will therefore provide a brief update:

The development of the SLiDAP imaging system under NSF sponsorship is continuing to progress. All system components have been purchased. The hardware for the SLiDAP system that we are developing in the LABB is nearing completion. There are various levels of software developments we are conducting in the LABB. Some of this software is near completion, work on other software is progressing well. Under the NSF grant, EOS Inc. (Vancouver, BC, Canada), is continuing their work under subcontract on the adaptation of their existing 3D photogrammetry software package specifically for the purpose of facilitating 3D-based remote Steller sea lion census operations.

D. Problems:

Currently, those tasks related to the transient juvenile capture program at the ASLC for bringing wild-caught juvenile Steller sea lions into temporary captivity at the ASLC, are experiencing delays. This is on account the fact that the permit to conduct this work has not been issued yet. We are hoping that this will happen in the near future, and that we can make up for the slight delays we have incurred at this stage.